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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

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Applicant(s):	BEHNAM MORADI	§	**Group Art Unit:**	2879
Serial No.:	09/386,972	§		
Filed:	August 31, 1999	§	**Examiner:**	K. Ramsey
Title:	Method for Improving Current Stability of Field Emission Devices	§	**Docket No.**	2008.003000

BOX AF
Assistant Commissioner for Patents
Board of Patent Appeals & Interferences
Washington, D.C. 20231

CERTIFICATE OF MAILING UNDER 37 C.F.R. § 1.8
I hereby certify that this correspondence is being deposited with the U.S. Postal Service with sufficient postage as First-Class Mail in an envelope addressed to: Assistant Commissioner for Patents, Washington, D.C. 20231, on the date below:

Aug. 20, 2002 — Yolanda Murillo
Date — Signature

APPEAL BRIEF

Dear Sir:

Applicant hereby submits an original and two copies of this Appeal Brief to the Board of Patent Appeals and Interferences in response to the final rejection mailed on December 31, 2001.

Enclosed is a check in the amount of $310.00 to cover cost for filing this Appeal Brief. If the check is inadvertently omitted, or should any additional fees under 37 C.F.R. §§ 1.16 to 1.21 be required for any reason relating to the enclosed materials, or should an overpayment be included herein, the Assistant Commissioner is authorized to deduct or credit said fees from or to Williams, Morgan & Amerson, P.C. Deposit Account No. 50-0786/2008.003000/99-0324.

08/27/2002 CCHAU1 00000051 500786 09386972
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I. REAL PARTY IN INTEREST

The real party in interest is Micron Technology, Inc., assignment recorded at Reel 10218, Frame 0561.

II. RELATED APPEALS AND INTERFERENCES

Applicant is not aware of any related appeals and/or interferences that might affect the outcome of this proceeding.

III. STATUS OF THE CLAIMS

Claims 2, 4-7, 10-11, 13-14, 16-17, 19-20, 22-23, and 25-33 have been finally rejected and are the subject of this appeal.

IV. STATUS OF AMENDMENTS

Claims 1, 3, 8-9, 12, 15, 18, 21, and 24, were cancelled after final. Claims 2, 4-7, 10-11, 13-14, 16-17, 19-20, 22-23, and 25-27 were amended after final. New claims 28-33 were added after final. In an Advisory Action dated March 4, 2002, Examiner entered each of the aforementioned amendments for purposes of appeal. The claims as currently pending are attached as Appendix A.

V. SUMMARY OF THE INVENTION

Generally, the present invention relates to a method of improving current stability of field emission displays. As shown in Figure 1 of the specification, a field emission display (FED) 100 has a base plate 105 and a face plate 110 opposite the base plate 105. The base plate 105 includes a number of cathode electrodes 115 and the face plate 110 includes a number of anode electrodes 120. A fluorescent material layer 130, having phosphors 135

disposed thereon, is deposited on the anode electrodes 120. See Patent Application, pg. 5, ll.13-19 and Figure 1.

To form a picture viewable on a viewing surface 125, a negative voltage and a positive voltage are respectively applied to one of the cathode electrodes 115 and a corresponding one of the anode electrodes 120 by an external circuit, and an electric field is established between that cathode electrode 115 and that anode electrode 120. Electrons are emitted from each of the emitters 140 where such an electric field is formed. The shape of the emitters 145 is generally conical, and electrons are emitted from the tips 140 of the emitters 145. The emitted electrons collide with the phosphors 135 in the fluorescent material layer 130 and excite electrons in the phosphors 135 into higher energy levels. Light is then emitted as the electrons in the phosphors 135 return to lower energy levels. See Patent Application, pg. 7, ll.11-21 and Figure 1.

As explained in the specification, operating the field emission device in the above manner results in certain materials outgassing from the anode of the device. If these outgassed materials are allowed to remain in the field emission device, they can contaminate and reduce the efficiency of the cathode element. Thus, Applicant discloses, and claims in independent claims 4, 11, 17, and 23, operating the field emission device in a pressure of at most about 10^{-8} Torr for at least approximately 15 minutes to remove at least a portion of materials from within said field emission device and then sealing the field emission device.

The result of operating the field emission device in the manner disclosed by Applicant is a device with increased life and greater current stability. As pointed out by Applicant on page 8, lines 11-16, of the present application, in one embodiment of the present invention, the field emission device was operated without observable tip degradation after running for many hours, even at high pressures. In contrast, conventionally manufactured field emission

devices running under standard conditions of about 10^{-5} Torr to about 10^{-6} Torr may show severe tip degradation after running for less than 100 hours.

VI. ISSUES ON APPEAL

Appellant respectfully requests that the Board review and overturn the one rejection present in this case. The following issue is presented on appeal in this case: Whether claims 2, 4-7, 10-11, 13-14, 16-17, 19-20, 22-23, and 25-33 are made obvious by *Konuma* (U.S. Pat. No. 6,042,441) in view of *Itoh, et al* (U.S. Patent No. 5,564,958) and *Watkins, et al* (U.S. Patent No. 5,827,102)?

VII. GROUPING OF THE CLAIMS

For the issue presented above, claims 2, 4-7, 10-11, 13-14, 16-17, 19-20, 22-23, and 25-33 can be considered to stand or fall together.

VIII. ARGUMENT

Claims 2, 4-7, 10-11, 13-14, 16-17, 19-20, 22-23, and 25-33 are not made obvious by *Konuma* in view of *Itoh* and *Watkins*.

The claims should be allowed over the cited references. The Examiner's rejection is based upon hindsight, using the Applicant's own teaching to combine elements from the cited references. The Examiner combines the references despite an explicit teaching to the contrary in one of the references.

To establish a *prima facie* case of obviousness, three basic criteria must be met. First, the prior art reference (or references when combined) must teach or suggest all the claim limitations. *In re Royka*, 490 F.2d 981, 180 U.S.P.Q. 580 (CCPA 1974). Second, there must

be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. That is, there must be something in the prior art as a whole to suggest the desirability, and thus the obviousness, of making the combination. *Panduit Corp. v. Dennison Mfg. Co.*, 810 F.2d 1561 (Fed. Cir. 1986). In fact, the absence of a suggestion to combine is dispositive in an obviousness determination. *Gambro Lundia AB v. Baxter Healthcare Corp.*, 110 F.3d 1573 (Fed. Cir. 1997). The mere fact that the prior art can be combined or modified does not make the resultant combination obvious unless the prior art also suggests the desirability of the combination. *In re Mills*, 916 F.2d 680, 16 U.S.P.Q.2d 1430 (Fed. Cir. 1990); M.P.E.P. § 2143.01. Third, there must be a reasonable expectation of success. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 U.S.P.Q.2d 1438 (Fed. Cir. 1991); M.P.E.P. § 2142. A teaching in the prior art that the claimed combination is not desirable suggests that there is not a reasonable expectation of success.

A. The Cited References

Konuma is directed to cleaning a cathode element of a cathode ray tube (CRT) and to enhancing the level of a vacuum in the CRT through the use of a getter in the tube. Konuma describes heating the getter material so that gases are emitted from the getter. A voltage is then applied to the cathode and a cathode cone to cause electrons to be emitted. These electrons collide with the gases from the getter, the gases are ionized, and the ions bombard the cathode to clean that element. The tube is then sealed and the gettering continues to enhance the level of vacuum in the sealed CRT. As Konuma is concerned with cleaning the cathode rather than operating the CRT so as to allow normal outgassing of materials from the

anode to occur, Konuma teaches operating the CRT at a reduced voltage, i.e. less than normal operating voltage, to protect the CRT from damage. See col. 4, ll. 23-30 and claim 1. In fact, Konuma is completely silent with regard to the issue of materials outgassed from the anode during normal operation of the CRT.

Itoh is directed to a method of manufacturing a display device that purportedly permits the life characteristics of the display device to be remarkably improved. As noted by the Examiner, Itoh states that the "electron emitting means" may be activated while subjecting the display device to baking, but that activating the display device while evacuating the tube "fail[s] to sufficiently discharge gas from the display device [and] thereby fail[s] to significantly improve the life characteristics of the display device." See Itoh, col. 2, ll.-39-42. In other words, Itoh teaches away from the presently claimed invention. Instead, Itoh proposes a different method to solve the problem of insufficient evacuation of the display device. According to Itoh's proposed method, a reducing gas is introduced into a display device, held in the display device for several minutes, and then evacuated until the pressure in the display device is about 10^{-5} Torr. After several repetitions of this process, the pressure is reduced to about $1x10^{-7}$ Torr and the tube is sealed. See Itoh, col. 5, ll.14-17. Itoh teaches that the life characteristics of the display device are "remarkably improved" by using the proposed method, in contrast to the alleged failure of activating the display device while evacuating the tube. See Itoh, col. 2, ll. 52.

Watkins does not operate a display device to clean an element or to evacuate impurities.

B. The Examiner's Rejection is Contrary to the Teachings of the Cited References and is Based on Hindsight Reconstruction.

The Examiner relies on Watkins for a teaching that a display device should be held in an atmosphere of 10^{-8} Torr for 1-2 hours prior to sealing in order to remove water and other contaminants. The Examiner asserts this teaching would be combined, by a person of ordinary skill, with Konuma and Itoh to realize a method of operating the device at a pressure of 10^{-8} Torr or less for at least approximately 15 minutes. Therefore, the Examiner concludes that claims 2, 4-7, 10-11, 13-14, 16-17, 19-20, 22-23, and 25-33 are made obvious by Konuma in view of Itoh and Watkins. Applicant respectfully disagrees for the following reasons.

As stated above, to establish a *prima facie* case of obviousness, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings and there must be a reasonable expectation of success. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure.

Applicant respectfully submits that the prior art does not provide any motivation to combine the references in the manner proposed by the Examiner or any reasonable expectation that the Examiner's proposed combination would be successful. Watkins is completely silent with regard to the issue of operating the display device and removing materials outgassed from the anode during normal operation of the CRT. The Examiner acknowledges this lack of teaching in Watkins. Konuma is similarly silent with regard to materials outgassed from the anode during normal operation of the CRT. As discussed above,

Konuma consequently teaches away from the proposed combination, *i.e.* Konuma teaches operating the display device at a reduced voltage.

Itoh also teaches away from the Examiner's proposed combination. In particular, Itoh teaches that the Examiner's proposed modifications would not be successful, *i.e.* would not result in a device with increased life and greater current stability. Itoh states that activating the display device while evacuating the tube "fail[s] to sufficiently discharge gas from the display device [and] thereby fail[s] to significantly improve the life characteristics of the display device." See Itoh, col. 2, ll.-39-42. Consequently, to overcome this alleged failure, Itoh teaches that a different process, described above, is preferable and would result in the life characteristics of the display device being "remarkably improved." See Itoh, col. 2, ll. 52. The Examiner has also acknowledged the teaching of Itoh as being contrary to his proposed combination.

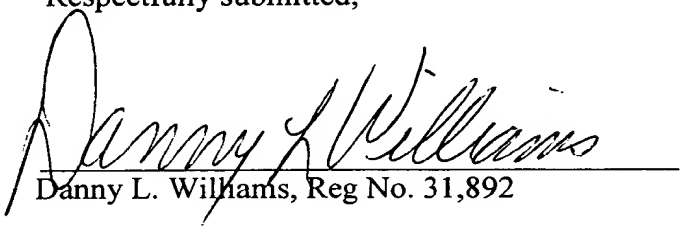
Applicant respectfully submits that a person of ordinary skill in the art, having benefit of the cited prior art, would conclude that the Examiner's proposed combination would fail to improve the life characteristics of the display device and would instead follow the teaching of Itoh. In fact, the only suggestion to form the Examiner's proposed combination, and the demonstration that the proposed method is successful, is found in Applicant's disclosure. Thus, Applicant submits that the Examiner's rejection of claims 2, 4-7, 10-11, 13-14, 16-17, 19-20, 22-23, and 25-33 in the present application as being obvious over Konuma in view of Itoh and Watkins is based upon an impermissible use of hindsight, using Applicant's own disclosure as the teaching to combine.

IX. CONCLUSION

In view of the foregoing arguments, Applicant respectfully requests that the board of Patent Appeals and Interferences reverse the decision rejecting claims 2, 4-7, 10-11, 13-14, 16-17, 19-20, 22-23, and 25-33, and direct the Examiner to pass the case to issue.

Respectfully submitted,

Date: August 20, 2002



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APPENDIX A

The claims on appeal are:

2. The method of claim 4, wherein operating the field emission device in the pressure of at most about 10^{-8} Torr includes operating the field emission device in a pressure of approximately 10^{-8} Torr.

4. A method of manufacturing a field emission device, the method comprising:

operating the field emission device in a pressure of at most about 10^{-8} Torr for at least approximately 15 minutes to remove at least a portion of materials from within said field emission device; and

sealing the field emission device.

5. The method of claim 4, the method further including:

sealing the field emission device after the at least approximately 15 minutes.

6. The method of claim 5, wherein sealing the field emission device after the at least approximately 15 minutes includes sealing the field emission device in a vacuum chamber.

7. The method of claim 5, wherein sealing the field emission device after the at least approximately 15 minutes includes sealing the field emission device in atmospheric pressure.

10. The method of claim 11, wherein operating the field emission device in the pressure of at most about 10^{-8} Torr includes operating the field emission device in a pressure of approximately 10^{-8} Torr.

11. A method of manufacturing a field emission device, the method comprising:

cleaning a base plate of the field emission device, the base plate having an opening formed therein;

assembling the base plate with a face plate of the field emission device;

sealing the assembled base plate and face plate of the field emission device; and

operating the sealed field emission device in a pressure of at most about 10^{-8} Torr for at least approximately 15 minutes to remove at least a portion of outgassed materials through the opening before sealing off the field emission device completely.

13. The method of claim 11, wherein sealing off the field emission device completely includes sealing the field emission device in a vacuum chamber.

14. The method of claim 11, wherein sealing off the field emission device completely includes sealing the field emission device in atmospheric pressure.

16. The device of claim 17, wherein operating the field emission device in the pressure of at most about 10^{-8} Torr includes operating the field emission device in a pressure of approximately 10^{-8} Torr.

17. A field emission device formed by a method comprising:

operating the field emission device in a pressure of at most about 10^{-8} Torr for at least approximately 15 minutes to remove at least a portion of outgassed materials through a tube before pinching off the tube to seal the field emission device.

19. The device of claim 17, wherein pinching off the tube to seal the field emission device after the at least approximately 15 minutes includes pinching off the tube in a vacuum chamber.

20. The device of claim 17, wherein pinching off the tube to seal the field emission device after the at least approximately 15 minutes includes pinching off the tube in atmospheric pressure.

22. The device of claim 23, wherein operating the field emission device in the pressure of at most about 10^{-8} Torr includes operating the field emission device in a pressure of approximately 10^{-8} Torr.

23. A field emission device formed by a method comprising:

cleaning a base plate of the field emission device, the base plate having an opening for a tube;

assembling the base plate with a face plate of the field emission device;

sealing the assembled base plate and face plate of the field emission device; and

operating the sealed field emission device in a pressure of at most about 10^{-8} Torr for at least approximately 15 minutes to remove at least a portion of outgassed materials from within said field emission device.

25. The device of claim 23, the method further including pinching off the tube to seal off the field emission device completely after the at least approximately 15 minutes.

26. The device of claim 25, wherein pinching off the tube to seal off the field emission device completely after the at least approximately 15 minutes includes pinching off the tube in a vacuum chamber.

27. The device of claim 25, wherein pinching off the tube to seal off the field emission device completely after the at least approximately 15 minutes includes pinching off the tube in atmospheric pressure.

28. The method of claim 4, wherein operating the sealed field emission device in a pressure of at most about 10^{-8} Torr for at least approximately 15 minutes includes operating the sealed field emission device in a pressure of at most about 10^{-8} Torr for approximately 15 to approximately 30 minutes.

29. The method of claim 4, wherein operating the sealed field emission device in a pressure of at most about 10^{-8} Torr for at least approximately 15 minutes includes operating the sealed field emission device in a pressure of at most about 10^{-8} Torr for approximately 20 minutes.

30. The method of claim 11, wherein operating the sealed field emission device in a pressure of at most about 10^{-8} Torr for at least approximately 15 minutes includes operating the sealed field emission device in a pressure of at most about 10^{-8} Torr for approximately 15 to approximately 30 minutes.

31. The method of claim 11, wherein operating the sealed field emission device in a pressure of at most about 10^{-8} Torr for at least approximately 15 minutes includes operating

the sealed field emission device in a pressure of at most about 10^{-8} Torr for approximately 20 minutes.

32. The device of claim 23, wherein operating the sealed field emission device in a pressure of at most about 10^{-8} Torr for at least approximately 15 minutes includes operating the sealed field emission device in a pressure of at most about 10^{-8} Torr for approximately 15 to approximately 30 minutes.

33. The device of claim 23, wherein operating the sealed field emission device in a pressure of at most about 10^{-8} Torr for at least approximately 15 minutes includes operating the sealed field emission device in a pressure of at most about 10^{-8} Torr for approximately 20 minutes.